Hierarchically Self-Organizing Magnetic Nanomaterials

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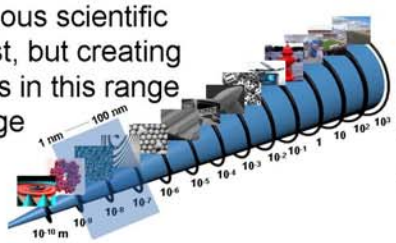
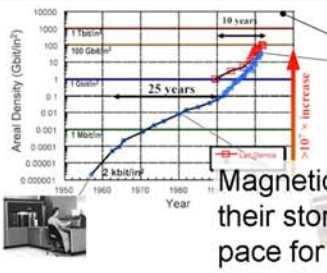
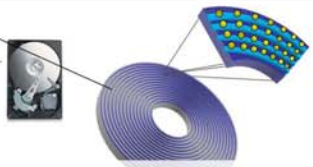
Motivation

The narrow length scale range of 1–100 nm is the focus of enormous scientific and technological interest, but creating useful, ordered structures in this range remains a grand challenge



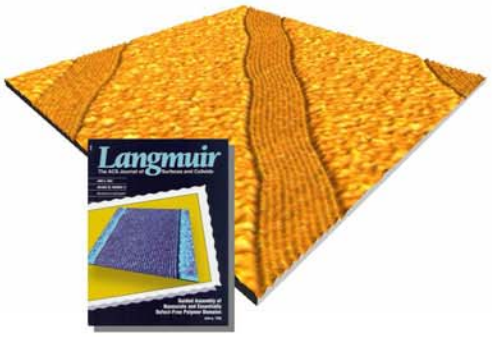




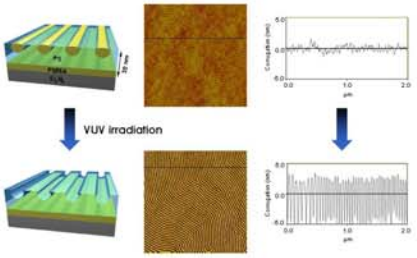
Magnetic storage media have increased their storage density at a remarkable pace for decades, but to continue this pace new strategies are needed

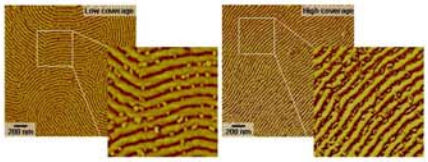
Major Accomplishments

Combining top-down and bottom-up techniques to produce highly aligned arrays of nanoscale features over macroscopic length scales



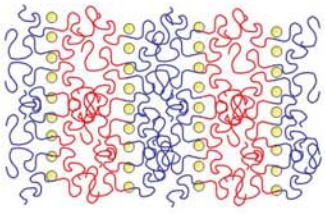
UV-modifying diblock copolymer films to serve as highly selective adsorption scaffolds for FePt nanoparticles



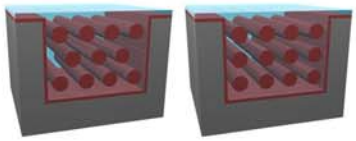


Future Directions

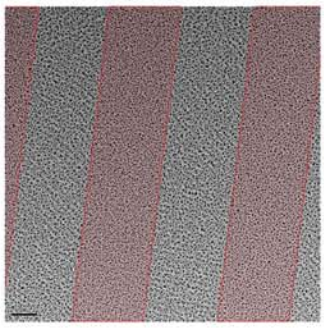
Gaining control over intradomain ordering of nanoparticles on polymeric templates

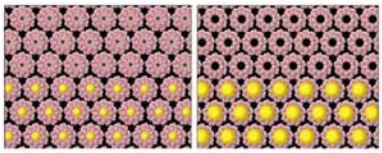


Probing the 3-D structure of polymers in confined geometries via synchrotron studies

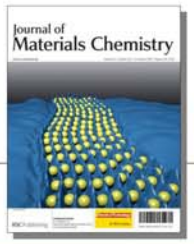


Using top-down approaches to tune the diffusion behavior of metals on polymer films





Tapping structural precision of biological materials for hybrid hard/soft matter nanomaterials



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